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February 26, 1987

VIA PUROLATOR COURIER

Mr. Warren Smull
Monsanto Industrial Chemicals Company
500 Monsanto Avenue
Sauget, Illinois 62201

Dear Mr. Smull:

Recently, you asked Geraghty & Miller, Inc. to comment on the revised Ecology and Environment, Inc. (E&E) work plan for the IEPA Dead Creek Sites project. The original work plan was prepared in May, 1986 and the revised work plan was prepared in August of the same year. Geraghty & Miller, Inc. has completed its review of both the original and revised work plans and we have organized our comments into several sections for convenience.

PURPOSE

Since May 1986, there has been a significant change in the purpose of the Dead Creek Sites project. Originally, the work plan proposed to define the type and quantities of hazardous waste present, evaluate contaminant releases to the environment (especially to the ground water), define the extent of contamination and determine the long term impact of contaminant releases. The primary purpose of the revised study is to determine whether or not one or more sites in the area can be added to the National Priority List (NPL) or the State Remedial Action Priority List (SRAPL) by combining some sites into a single unit, then rescoring the unit. For instance sites O (the old Sauget treatment lagoons), Q (the old Sauget Landfill) and R (the Monsanto Landfill) would be combined and regarded as one site for the purposes of rescoring using the Hazard Ranking System (HRS). The original purposes of characterizing contaminants and environmental impact are now of secondary importance.

The stated purpose of the revised work plan is a little confusing because it was our understanding that the Dead Creek Sites study area (formerly called Sauget Sites) was on the SRAPL when the revised work plan was prepared in August 1986. If the area was not included on the list at that time, it is on the SRAPL now (see Illinois Register, December 1, 1986).

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Whether or not the Dead Creek Sites are on the NPL or SRAPL is unimportant compared to the ultimate impact the change in direction of the study will have on the nature and timing of remedial action. The main purpose of any remedial investigation/feasibility study (RI/FS) is to plan a remedial action program. We believe that E&E's new approach to the study will only delay remedial action. The original work plan was not comprehensive enough to obtain the necessary information for remedial action planning at some sites, but it was a first step. Much of the information the IEPA is now committed to obtaining in order to put the sites on the NPL will be inconclusive and will be of little value in planning and evaluating remedial action.

The reasoning used by the IEPA and E&E in changing the scope of investigation appears to be flawed. On page 2-2, the work plan implies that remedial action would not be possible unless a site or sites were on the NPL or the SRAPL because of insufficient funding. Another reason for change in the scope of work given is that inclusion on the NPL or SRAPL would put pressure on the potentially responsible parties (PRP's) to participate in and provide financial support for remedial action. However, the sites are already on the SRAPL and State monies should therefore be available. The owners of most, if not all, sites can be clearly identified and there is no reason at this point to assume that the responsible parties will not participate in and provide financial support for remedial activities. Monsanto and Sauguet Development and Research Association (SSDRA), for instance, have already conducted extensive investigations and have approached the IEPA with remedial plans for two sites, one of which would not have been discovered had it not been for Monsanto's voluntary effort. We believe that there is no particular advantage in attempting to get the Dead Creek Sites included on the NPL, especially in view of the fact that the State already has sufficient enforcement power with regard to remedial action and funding will probably be available.

The tone of the work plan is somewhat biased. On page 1-1, the work plan categorically states the purpose "... is to enable the collection of sufficient data to achieve placement of the Dead Creek Sites on the NPL or the SRAPL..." While we do not mean to imply that the IEPA or E&E (a nationally known firm) would conduct a biased study (E&E does state that inclusion on the NPL cannot be guaranteed), we would have preferred more neutral language. A suggested statement of purpose could be: "The data obtained during the study will be evaluated to determine whether or not it is possible to include a site or sites on the NPL or SRAPL".

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SCOPE OF WORK

The scope of work is divided into two phases. E&E proposes to employ the HRS (Hazardous Ranking System) in Phase I to add site or sites to the NPL. If the HRS system cannot achieve this goal, E&E will attempt to list these sites using the Health Advisory Mechanism, which will involve additional studies.

HRS Study

Table 3-1 (abstracted from the work plan) compares the original and revised scopes of the investigation. It can be seen that the largest shift in emphasis is on the collection of air samples at the expense of surface and surface-water/sediment samples. An additional 19 subsurface soil samples are proposed and an additional 13 ground-water samples are recommended. The original scope called for 20 new monitoring wells, while the revised scope proposes 25 wells. In addition to the environmental sampling, the IEPA also proposes a water supply search to determine whether or not ground water is being used as a source of drinking water.

Air Sampling

We believe that the large number of air samples will provide data of dubious value. First of all, it will be extremely difficult to demonstrate what impact the Dead Creek Sites are having on air quality in the region and it will be very difficult to differentiate the affects of the sites themselves from impacts caused by other sources, such as stack emissions. Given the general level of industrial activities, other sources are likely to have a much greater impact on air quality than the sites themselves.

In addition, except for Dead Creek, most if not all the sites are covered with clean soil. Therefore, contaminated particulate matter cannot escape and people will not be exposed. In addition, there is no evidence of volatile emissions from any of the sites. We believe, therefore, that it would be much more cost effective to devote the time and resources now committed to air quality sampling to an evaluation of the areas impact on ground-water which is the most likely route by which people could get exposed.

Surface Soil Sampling

Because most sites are covered with clean soil, we believe that surface soil sampling would also be of limited value. The IEPA and E&E appear to have recognized this and have reduced significantly the number of surface soil samples to be collected.

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Residential Well Sampling

The work plan appears to be concerned with some residential wells that are being used as sources of drinking water. If there is a possibility that these wells are contaminated, the first task of the RI/FS should be to sample the wells and determine whether or not contaminated water is being consumed. From the available information, this possibility of contaminated household wells represents the only imminent risk to human health that has been identified.

The Geraghty & Miller, Inc. studies, which involved a search of State Agency files, indicated that residential wells are not being used for potable purposes in Sauget. Informal, but thorough, inquiries made by Monsanto indicate that a few residential wells do exist but they are being used for purposes other than for drinking water.

Quality Assurance/Quality Control

In any RIFS study, quality control is an extremely important factor. E&E has commendably gone to great lengths to insure that representative soil and water samples will be collected, and to prevent cross-contamination. However, some quality control measures seem excessive. For instance, during the well installation program E&E believes that it is necessary to install a temporary work casing in each borehole to prevent high density contaminants in the shallow subsurface formation (Cahokia Aluvium) from entering the underlying Henry Formation. This installation method will require decontaminating the augers twice during each installation of the water table well. The objective of the shallow wells is to determine what constituents are in the upper saturated zone. Therefore, this procedure does not seem warranted, considering the additional expense without any benefit.

The collection of subsurface soil samples will be performed using stainless steel trowels. To prevent cross-contamination between sampling locations, each trowel will be used only once and then disposed of after sample collection. The procedure for decontaminating drilling equipment is to first wash the equipment and tools with a steam cleaner, followed by washing with acetone and finally with distilled water. The disposal of sampling trowels, as well as the cleaning procedures for drilling equipment seem to be extreme. Acetone should not be used in the rinsing procedures, as E&E has included acetone on its list of parameters to be analyzed.

In general, the data base that will be developed by the study will be insufficient to characterize the nature and volume of waste at the sites, and it also will not be sufficient to define the extent or long term impact of ground-

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water contamination. The number of wells proposed is not nearly sufficient to characterize the ground-water system over so large an area. As the Monsanto and SSDRA studies have already indicated, it is necessary to investigate all three hydrogeologic zones in order to infer the origin of contaminants and to draw conclusions with regard to contaminant migration.

Health Advisory Mechanism

Geohydrologic Study (Task 1)

In the event that the HRS study fails to include any of the sites or combination of sites on the NPL, we believe there is no need for E&E or the IEPA to undertake much of the work that is proposed for Site R (the Monsanto Landfill) in the Health Advisory Mechanism study. In Task 1A, the work could be limited to resampling existing wells in the vicinity of the Monsanto Landfill. There is no need to drill additional wells in the landfill where approximately 45 wells already monitor all three hydrogeologic zones.

Task 1B is also unnecessary because Geraghty & Miller, Inc. has obtained over three years of water-level data from seven automatic water level recorders on wells on the Monsanto property. River stage data from the U.S. Army Corp. of Engineers gage on the Poplar Street Bridge was found by Geraghty & Miller, Inc. to be adequate for tracking river level elevations.

Page 3-25 of the E&E work plan states that historical water-level records indicate that a cessation of pumping will cause the water table to rise "within a few feet of the surface" at Sites Q (Sauget Landfill) and R. To our knowledge, there are no historical records that indicate this will occur, and our study indicates that this assertion is incorrect. Large scale industrial pumping has essentially ceased and, except for some intermittent pumping for dewatering purposes associated with the installation of the new sewer system, there is no pumping going on at Sites Q and R. The depth to water at Site R during flood conditions can be estimated by utilizing existing water-level data compiled by Geraghty & Miller, Inc. during our study which began in November 1983. The Mississippi River reached its highest level in recorded history during April 1973 when its stage was determined to be 43.3 feet above gage zero, or 423.2 feet above msl. The second highest river stage level occurred on October 9, 1986 (39.0 feet - 418.9 feet msl). At that time a well adjacent to the Mississippi River (outside the landfill) recorded its highest water level of 10.5 feet below land surface. The depth to water in the landfill itself was greater due to the higher topography. During other high river stage conditions (30 - 35 feet) when all landfill

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monitoring wells were measured, the depth to water in the landfill was typically 21 to 28 feet below land surface.

In any event, contaminants "in the upper portions of the site soil" will not be transported at increased rates during times of high river stage as postulated by E&E. In fact, high river stages result in the bank storage effect which, in turn, reverses the hydraulic gradient. When river levels are high, flow is from the river to the land and under these circumstances the discharge of contaminants actually ceases. Our study indicates that flow reversal occurs approximately 12% of the time.

There is also no evidence that buried drums (if there are any) at Site R will rupture at high river stages. The drilling program in the Krummrich Landfill encountered no drums and, even if drums were present, there is no reason to expect them to rupture suddenly, causing a "slug" of contamination to move into the river. Our water-level measurements made in October 1986 when the river reached its highest level since 1973 indicates scenario number 3 (see E&E proposal) will in all likelihood not occur.

Seep Sampling (Task 3)

Sampling of the seeps (Task 3) is also regarded as unnecessary. In addition, if E&E and IEPA wish to estimate the discharge of contaminants from the ground-water system to the Mississippi River, they should rely on ground-water gradients and the results of analytical work on ground-water samples collected from the wells along the river bank.

On behalf of Monsanto, Geraghty & Miller, Inc. has already estimated the quantity of priority pollutants discharging to the Mississippi River from Site R at 77 lbs/day. Dilution is so great in the river that the 77 lbs/day discharge will probably result in no measurable impact.

While there is limited data available to estimate the organic loadings to the Mississippi River from POTW's (because organic compound discharges have not been studied in detail in the St. Louis area), there is sufficient information to indicate that these discharges are significant and may be far more important than ground-water discharges. Unpublished data from the Missouri Department of Natural Resources (DNR), Black and Veatch (1982) and pilot studies for the new American Bottoms Regional Treatment Plant indicate that the impact of POTW discharge on the river may be considerable. Table 1 (attached) compares the loading from ground-water discharge at Site R to the loadings from the American Bottoms and Bissell Point Treatment Plants and shows that the discharge of some contaminants is greater from the POTW's than from the ground water. Table 2 shows the data available from the Old Sauget Treatment Plant.

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Limited sampling for dioxins and PCB's in the landfill indicate that these compounds are not present in the ground water. Comprehensive sampling for mercury, lead and cadmium shows that these metals are also not of concern at Site R. We suggest that IEPA resample selected wells to confirm our findings (if they are considered suspect), and if these compounds are not present in the ground water they cannot be discharging to the river from the Monsanto Landfill.

Fish and Sediment Survey (Task 4)

Like the air quality sampling survey, the fish and sediment survey is likely to be inconclusive. Given the large number of sources discharging contaminants to the Mississippi River, including several POTWs, it will be virtually impossible to differentiate the impact of ground-water discharge on the river from the impacts from all other sources. Simply demonstrating gross contamination of the Mississippi River or the presence of contaminants in fish will not be sufficient to assess the impact on the river from the Dead Creek Sites.

Cost of the Study

The cost of the study has been re-estimated by E&E. The original cost was approximately \$997,554, and the new cost is \$1,189,362 (assuming that the H/A study is undertaken in addition to the HRS study), which is an increase of approximately \$191,808.

It is somewhat difficult to determine whether or not the study is cost effective because all of the unit costs have not been provided, and we are not privy to some of E&E's assumptions. However, the total cost appears to be excessive for the proposed scope of work given Geraghty & Miller, Inc.'s experience with similar investigations, especially in view of the fact that much of the work proposed in the H/A study is unnecessary for Site R. The high cost appears to be due to the excessive attention to quality assurance/quality control (stainless steel wells, for instance) and the cost of laboratory fees which constitute approximately one-third of the budget.

The study would be much more cost effective if IEPA and E&E redirected some of their efforts in air and soil monitoring and relaxed the level of their quality assurance/quality control program. Because the primary potential route of exposure to humans is via the ground-water system, the study should concentrate on that medium rather than others.

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SUMMARY

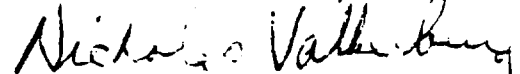
Since August of 1986 when the revised work plan was prepared by E&E, IEPA has received copies of the Geraghty & Miller, Inc. reports which discuss the results of extensive ground-water studies made on behalf of Monsanto and the SSDRA. These reports contain much information which could be used by E&E to reduce the scope of its own investigation. For instance, no well drilling is necessary at Sites O and R and the geohydrologic study to determine water-level fluctuations is also unnecessary.

In addition to changing the scope of the investigation, the IEPA and E&E have altered the purpose of the study, which is now to obtain enough information to include the sites on the NPL. In order to gain the NPL listing, E&E and IEPA have undertaken some tasks, such as the fish and air sampling, which will probably be inconclusive and will not yield useful information for planning remedial action. The misdirected effort is not cost effective and will delay remedial action.

Please contact us if you have questions or need additional information.

Sincerely,

GERAGHTY & MILLER, INC.



Nicholas Valkenburg
Associate

NV:dv

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REFERENCE

Black and Veatch, 1982, Toxic Materials Impact Upon the Mississippi River; prepared for the St. Louis Sewer District

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Table 3-1

**COMPARISON OF SAMPLING ANALYSES:
ORIGINAL AND REVISED SCOPES OF WORK**

Media	Site	Original Scope	Revised Scope	Difference
Air*	G/B	0	54	
	Q/R	0	54	
	Field QC	0	30	+138
Surface soil	G	40	40	
	H	5	0	
	I	32	0	
	J	5	2	
	N	3	0	
	Field QC	15	6	
	To be determined (Dioxin)	10	0	-62
Subsurface soil	G	10	10	
	H	5	10	
	I	15	15	
	L	4	4	
	O	0	10	
	J	5	3	
	K	3	3	
	N	2	2	
	P	0	3	
	Field QC	12	15	+19
Surface Water/Sediment	A	3	2/6†	
	B	3	2/6†	
	C	2/2	2/6†	
	D	1/2	2/6†	
	E	3/10	§	
	F	4/10	§	
	M	2/3	2/3	
	Field QC	5/6	3/6†	-10/0
Groundwater	Existing monitoring wells (IEPA)	12	12	
	Residential wells	5	5	
	New monitoring wells	20		
	G		2	
	H		4	
	I		6	
	O		5	
	Q		8	
	Existing monitoring wells (Monsanto) at R		6	
	Field QC for wells	8	10	+13
Total samples				
Soil/sediment		199	146	
Water		68	71	
Air			138	
TOTAL				+88

*Phase 1 only.

†Postpone pending results of revised scope-of-work investigations.

§Each sector and field QC includes two samples to be analyzed for dioxin and dibenzofurans.

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TABLE 1
LOADING TO MISSISSIPPI RIVER

PARAMETER	AMERICAN BOTTOMS REGIONAL TREATMENT (LBS/DAY)	GROUND-WATER DISCHARGE FROM AQUIFER (LBS/DAY)	BISSELL POINT (LBS/DAY)
FLOW	27 MGD	2.6 MGD	146 ¹⁾
2-NITROCHLOROBENZENE	45	6	NO DATA
BENZENE	1.4	7	0 ²⁾
MONOCHLOROBENZENE	1	38	800 ²⁾
PRIORITY POLLUTANT PHENOLS	NO DATA	16	1,200 ^{2,3)}
OTHERS	NO DATA	10	NO DATA
TOTAL PRIORITY POLLUTANT ORGANICS	NO DATA	77	NO DATA
COD	12,385	NO DATA	680,000
BOD	4,504	NO DATA	380,000

1) AVERAGE OF 7-9-85 and 1-3-86 DATA

2) FROM BLACK & VEATCH, 1982

3) TOTAL PHENOLS

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Table 2. Discharges from the Old Sauget Treatment Plant

Village of Sauget 021A											
Parameters	Permit Condition (Kd/day) (lbs/day)	April 1985			May 1985			June 1985			
		(mgd)	(L/day)	(Kd/day) (lbs/day)	(mgd)	(L/day)	(Kd/day) (lbs/day)	(mgd)	(L/day)	(Kd/day) (lbs/day)	
Average effluent flow	---	13.50	3.1×10^7	---	10.02	4.1×10^7	---	10.14	3.8×10^7	---	---
Average BOD	9.856	21.723	---	5.608	12.360	---	5.508	12.140	---	4.333	9.550
Cyanide	4.9	10.8	---	.11	.24	---	.11	.24	---	.09	.20
Mercury	.11	.24	---	.03	.07	---	.03	.07	---	.02	.04
Phenol	.739	1.629	---	53	117	---	45	99	---	44	97
July 1985											
Parameters	Permit Condition (Kd/day) (lbs/day)	(mgd)	(L/day)	(Kd/day) (lbs/day)	(mgd)	(L/day)	(Kd/day) (lbs/day)				
Average effluent flow	---	11.13	4.1×10^7	---	10.15	3.8×10^7	---				
Average BOD	9.856	21.723	---	4.606	10.152	---	3.736	8.234			
Cyanide	4.9	10.8	---	0.16	.35	---	.06	.13			
Mercury	.11	.24	---	.03	.07	---	.03	.067			
Phenol	.739	1.629	---	46	101	---	38	84			
September 1985											
Parameters	Permit Condition (Kd/day) (lbs/day)	(mgd)	(L/day)	(Kd/day) (lbs/day)	(mgd)	(L/day)	(Kd/day) (lbs/day)				
Average effluent flow	---	9.17	3.5×10^7	---	8.77	3.3×10^7	---	9.53	3.6×10^7	---	---
Average BOD	9.856	21.723	---	3.840	8.463	---	5.049	11.128	---	4.974	10.963
Cyanide	4.9	10.8	---	0.16	.35	---	.05	.11	---	.05	.11
Mercury	.02	.04	---	.02	.04	---	.02	.04	---	.03	.07
Phenol	.739	1.629	---	52	115	---	43	95	---	58	128
December 1985											
Parameters	Permit Condition (Kd/day) (lbs/day)	(mgd)	(L/day)	(Kd/day) (lbs/day)	(mgd)	(L/day)	(Kd/day) (lbs/day)				
Average effluent flow	---	10.11	3.8×10^7	---	9.45	3.6×10^7	---				
Average BOD	9.856	21.723	---	4.258	9.385	---	5.577	12.292			
Cyanide	4.9	10.8	---	0.13	.29	---	.08	.18			
Mercury	.02	.04	---	.03	.07	---	.03	.07			
Phenol	.770	1.697	---	73	161	---	59	130			

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Table 2. (Continued)

Village of Saugat 001B No overflow for 001B occurred during January 1986, October 1985, September 1985 and May 1985.

Parameters	Permit Condition (Kd/day) (lbs/day)	April 1985		June 1985		July 1985	
		(mgd)	(Kd/day) (lbs/day)	(mgd)	(L/day) (Kd/day) (lbs/day)	(mgd)	(L/day) (Kd/day) (lbs/day)
Average effluent flow	---	---	0.96 3.6×10^6	---	1.95 7.4×10^6	---	2.40 9.1×10^6
Average BOD	9,856 21,723	---	174 383	---	424 934	---	354 780
Cyanide	---	---	.004 .009	---	.03 .07	---	.06 .13
Mercury	---	---	.004 .009	---	.009 .020	---	no analysis
Phenol	739 1,629	---	4 8.8	---	8 18	---	no analysis

Parameters	Permit Condition (Kd/day) (lbs/day)	August 1985		November 1985		December 1985	
		(mgd)	(L/day) (Kd/day) (lbs/day)	(mgd)	(L/day) (Kd/day) (lbs/day)	(mgd)	(L/day) (Kd/day) (lbs/day)
Average effluent flow	---	---	1.02 3.9×10^6	---	5.02 1.9×10^7	---	1.30 4.9×10^6
Average BOD	9,856 21,723	---	254 560	---	564 1,243	---	492 1,084
Cyanide	---	---	.005 .01	---	.09 .20	---	.02 .04
Mercury	---	---	.005 .01	---	.02 .04	---	.005 .01
Phenol	739 1,629	---	4 8.8	---	19 42	---	10 22

Parameters	Permit Condition (Kd/day) (lbs/day)	February 1986	
		(mgd)	(L/day) (Kd/day) (lbs/day)
Average effluent flow	---	---	---
Average BOD	9,856 21,723	---	---
Cyanide	---	---	---
Mercury	---	---	---
Phenol	739 1,629	---	10 22

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